

CLAIMS

We claim:

- 1 1. A light-emitting device comprising:
2 a heterostructure of semiconductor materials having at least one p and one n-type
3 layer; and
4 a p and an n contact, the p contact electrically connected to the p-type layer, the n
5 contact electrically connected to the n-type layer, wherein one of the p and n contacts is a
6 multi-layer contact having at least one ohmic contact layer and one reflector layer.
- 1 2. A device, as defined in claim 1, wherein the multi-layer contact has a
2 reflectivity greater than 75%.
- 1 3. A device, as defined in claim 1, wherein the multi-layer contact has a specific
2 contact resistance less than $10^{-2} \Omega\text{-cm}^2$.
- 1 4. A device, as defined in claim 1, the multi-layer contact further comprising a
2 barrier layer interposing the ohmic contact layer and the reflector layer.
- 1 5. A device, as defined in claim 1, wherein the reflector layer has a thickness
2 greater than 500Å.
- 1 6. A device, as defined in claim 1, wherein the ohmic contact layer has a thickness
2 less than 200Å.
- 1 7. A device, as defined in claim 1, wherein the reflector layer is selected from a
2 group that includes Al, Cu, Rh, Pd, and Au.
- 1 8. A device, as defined in claim 1, wherein the p and n contacts are on opposing
2 faces of the heterostructure.

1 9. A device, as defined in claim 8, wherein the ohmic contact layer includes Ni
2 and Ag.

1 10. A device, as defined in claim 8, wherein the reflector layer is Ag.

1 11. A light-emitting semiconductor device comprising a GaN-based
2 heterostructure having at least one p and one n-type layer,
3 a p and an n contact, the p contact electrically connected to the p-type layer, the n
4 contact electrically connected to the n-type layer, wherein one of the p and n contacts is a
5 multi-layer contact having at least one ohmic contact layer and one reflector layer.

1 12. A device, as defined in claim 11, wherein the multi-layer contact has a
2 reflectivity greater than 75%.

1 13. A device, as defined in claim 11, wherein the multi-layer contact has a
2 specific contact resistance less than $10^{-2} \Omega\text{-cm}^2$.

1 14. A device, as defined in claim 11, the multi-layer contact further comprising a
2 barrier layer interposing the ohmic contact layer and the reflector layer.

1 15. A device, as defined in claim 11, the reflector layer having a thickness greater
2 than 500Å.

1 16. A device, as defined in claim 11, the ohmic contact layer having a thickness
2 less than 200Å.

1 17. A device, as defined in claim 11, the reflector layer being selected from a
2 group that includes Al, Cu, Rh, Pd, and Au.

1 18. A device, as defined in claim 11, wherein the ohmic contact layer is selected
2 from a group that consists of Ti, Au/NiO, and Ni/Au.

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